

**STRUCTURES OF AND METHODS OF FABRICATING
TRENCH-GATED MIS DEVICES**

Anup Bhalla

Dorman Pitzer

Jacek Korec

Xiaorong Shi

Sik Lui

ABSTRACT

10 In a trench-gated MIS device contact is made to the gate within the trench,
thereby eliminating the need to have the gate material, typically polysilicon, extend
outside of the trench. This avoids the problem of stress at the upper corners of the
trench. Contact between the gate metal and the polysilicon is normally made in a
gate metal region that is outside the active region of the device. Various
15 configurations for making the contact between the gate metal and the polysilicon
are described, including embodiments wherein the trench is widened in the area of
contact. Since the polysilicon is etched back below the top surface of the silicon
throughout the device, there is normally no need for a polysilicon mask, thereby
saving fabrication costs.

20